VERSION 2

SONY
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SpectraLayers™ Pro

User Manual

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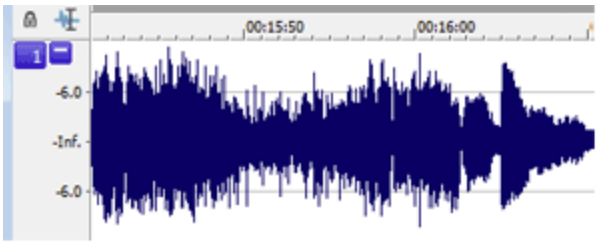
Chapter 1

About SpectraLayers

Spectral...

In most audio applications, audio is displayed as a waveform that represents audio in the time domain (amplitude vs. time):

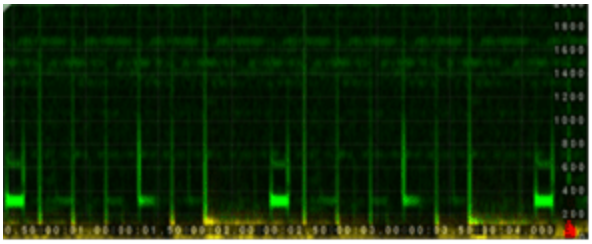


Amplitude

Time

This representation shows the global power of sound; however it doesn't show what's inside the sound.

Spectral data represents sound in the frequency domain. You can think of it like a musical score: the higher the peaks, the higher the tones; the stronger the peaks, the stronger the tones. Everything can be analyzed with this representation: music, voice, even noise.



Frequency

Time

Spectral analysis has a resolution: you have to choose between time and frequency accuracy. That's called a window size, and a size of 2048/4096 should be good for most situations (with a file sampled at 44,100 Hz or 48,000 Hz). Feel free to change the size on the fly as the accuracy of your work highly depends on it.

You should also play with the multiplier and gamma settings to see the small peak details in the spectral view.

...Layers

The layer system allows you to refine your work extensively in a nondestructive way.

Most audio applications use additive tracks only, which is good for mixing various tracks together. In SpectraLayers, you also have subtractive layers, which allow you to remove sound from your mix.

This is possible thanks to the spectral approach of sound: if you extract frequencies from the mix and transfer them into a new subtractive layer, it will subtract these frequencies from the mix.

Subtractive layers work in the same way numbers are added and subtracted: if you have 4 and remove 2, you will only have 2 left. If you remove 2 again, will end up with 0, which means no sound at all for the frequencies you have removed.

Take note that if you remove 2 again (so if you remove more than you have at start) you will end up with -2, which means you will have sound again (with opposite phase, but it sounds exactly the same). So it is important you know what quantity you add or remove from the mix.

Processes and Tools

Processes work the same way they do in usual audio applications: you select an area, and the process is applied to the whole area. For more information, see "Processing spectral data" on page 51.

The difference with SpectraLayers is that you can select not only time but also frequency areas, so the process is only applied to a certain range of frequencies.

The processes are also different by nature, because they are designed to use spectral data instead of raw audio data, so the purpose and range is not the same as usual audio processes.

Tools work the same way they do in paint applications: they are local to the mouse position and allow you to work on specific frequencies. For more information, see "Editing tools" on page 15.

Info tools give the user specific information about spectral data. For more information, see "Displaying spectral information" on page 33.

Extract tools are designed to make the frequency transfer easy from the mix to a specific layer, by semiautomatically helping the user. For more information, see "Extracting spectral data" on page 37.

Modify tools allow the user to retouch spectral data. For more information, see "Modifying spectral data" on page 45.

Draw tools generate spectral data from scratch. For more information, see "Drawing spectral data" on page 49.

System requirements

Windows

- Microsoft® Vista® 32-bit or 64-bit SP2 or Windows 7 32-bit or 64-bit SP1
- Dual-core processor (quad-core processor recommended)
- 2 GB RAM
- 2 GB of free hard disk space (for temporary files)
- Supported NVIDIA or AMD/ATI GPU with 512 MB or more RAM:

  NVIDIA: GeForce GTX 2xx Series or higher with driver 285.62 or later. Quadro 400 or higher (or Quadro FX x700 or higher) with driver 285.62 or later.

  AMD/ATI: Radeon HD 47xx or higher GPU with Catalyst driver 11.7 or later. If using a FirePro GPU, FirePro unified driver 8.85 or later is required.
- 1280x720 display resolution
- Windows-compatible audio hardware
- Internet Explorer 8 or later, Firefox 10 or later, or Google Chrome 13 or later (for viewing help)

Mac OS

- Mac OS X 10.7 (Lion) or 10.8 (Mountain Lion)
- Intel dual-core processor (quad-core processor recommended)
- 2 GB RAM
- 2 GB of free hard disk space (for temporary files)
- OpenGL 2.1 compatible graphics card with 256 MB RAM
- 1280x720 display resolution
- CoreAudio-compatible audio hardware

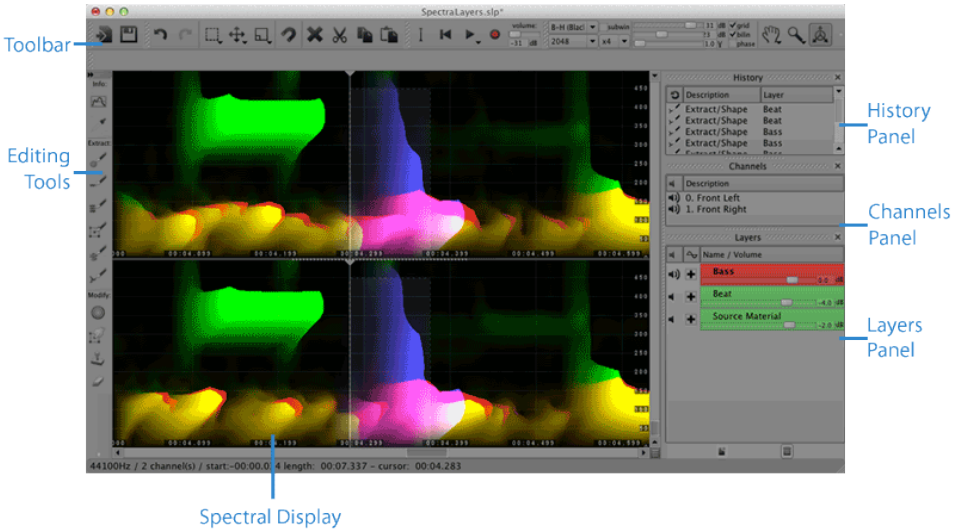
⚠ Supported hardware (check About This Mac / More Info / System Report / Model Identifier):

- iMac 7,1 (mid 2007) and later
- Mac Pro 3,1 (early 2008) and later
- MacBook 5,1 (early 2009) and later
- MacBook Pro 3,1 (mid 2007) and later
- MacBook Air 2,1 (late 2008) and later
- Mac Mini 3,1 (early 2009) and later

Chapter 2

The SpectraLayers interface

The SpectraLayers interface is divided into five primary areas.



- The menu bar (not pictured) provides access to frequently used commands and options.
- The toolbar provides access to commonly used functions. For more information, see "The toolbars" on page 10.
- The editing tools to the left of the spectral display provide access to spectral information, extraction, and editing. For more information, see "Editing tools" on page 15.
- The spectral display displays the spectrum of the layers in your project. For more information, see "Spectral display" on page 18.
- The panels on the right side of the spectral display show editing history, audio channels, and your project's layers. For more information, see "The History panel" on page 20, "The Channels panel" on page 21, and "The Layers panel" on page 22.

The toolbars

SpectraLayers includes several toolbars you can use.

Choose **View** > **Toolbars**, and then choose a toolbar to show or hide it.

The File toolbar

Choose **View** > **Toolbars** > **File** to show or hide the File toolbar.

Button	Item	Description
	Import Layer	Click to add an audio file as a new layer in your SpectraLayers project. For more information, see "Importing a layer" on page 25.
	Save Project	Click to save your project. For more information, see "Saving a project" on page 28.

The Edit toolbar

Choose **View** > **Toolbars** > **Edit** to show or hide the Edit toolbar.

Button	Item	Description
	Undo	Click to reverse your last edit.
	Redo	Click to restore the last Undo action.
	Select	Click to create a selection in the spectral display. You can click the down arrow to choose whether you want to create a rectangular selection or limit your selection to a time or frequency. When editing, tools and filters will be limited to the selected area. For more information, see "Selecting spectral data" on page 35.
	Move	Click to move the selection in the spectral display by dragging it. You can click the down arrow to choose whether you want to constrain movement to the time or frequency.
	Scale	Click to scale the selection in the spectral display by dragging it. You can click the down arrow to choose whether you want to scale by time, frequency, or proportionally.
	Snap to Grid	Click to enable snapping the cursor to the grid in the spectral display.
	Delete	Click to delete the selected layer or to delete the selected area from the selected layer.
	Cut	Click to cut the selected area from the selected layer and place it on the clipboard.

Button	Item	Description
	Copy	Click to copy the selected layer or the selected area in the selected layer and place it on the clipboard.
	Paste	Click to insert the clipboard contents to the selected layer.

Transport Controls

Choose **View** > **Toolbars** > **Transport Controls** to show or hide the Transport Controls toolbar.

Button	Item	Description
	Time Cursor	When this button is selected, you can click in the spectral display to position the time cursor. If you want the cursor to adjust its position when editing, select **Options** > **Cursor** > **Smart Cursor Location**: ▪ When you select a layer, the cursor will move to the start of that layer so you can start playback where the audio content begins. ▪ When you select a blank layer, the cursor when snap to the beginning of new audio content that you draw or extract from other layers. For more information, see "Drawing spectral data" on page 49 or "Extracting spectral data" on page 37.
	Rewind	Click to move the cursor to the time cursor, and click again to move the cursor to the beginning of the spectral display.

Button	Item	Description
	Play	Click to start playback from the time cursor. Click the down arrow to choose additional playback modes, including **Play from Start** and **Play Clipboard**. If you want to use the **Play** button to start and pause playback, select **Options** > **Cursor** > **Pause Playback**. When the command is not selected, the **Play** button will start and stop playback. If you want the spectral display to follow the cursor during playback, select **Options** > **Cursor** > **Scroll Playback**. When the command is not selected, the cursor can move out of the spectrum display during playback.
	Loop Playback	Click to toggle looped playback. When the button is selected, the selection in the spectrum display plays in a continuous mode. For more information, see "Selecting spectral data" on page 35.
	Record	Click to record to the selected layer. For more information, see "Recording to a layer" on page 26.
	Volume	Drag the fader or use the edit box to adjust the overall gain of your layer mix.

The Spectral Settings toolbar

Choose **View** > **Toolbars** > **Spectral Settings** to show or hide the Spectral Settings toolbar.

Item	Description
Window Type	Choose a setting from the drop-down list to set the window type used for analysis. We recommend using **Blackman-Harris** for most applications.
Window Size	Choose a setting from the drop-down list to set the size (in samples) of the analysis window. Higher numbers produce increased frequency resolution at the expense of lower time resolution and longer computational time.
Window Subdivision	Select the **subwin** check box if you want to subdivide the analysis window for extra time precision.
Window Overlap	Choose a setting from the drop-down list if you want to overlap the analysis windows for extra time precision.

The Spectral Display toolbar

Choose **View** > **Toolbars** > **Spectral Display** to show or hide the Spectral Display toolbar.

Button	Item	Description
	Zebra Pattern Threshold	Drag the fader to set the threshold above which cross hatching will be displayed in the spectral display.
	Level Multiplier	Drag the fader to multiply the spectral display dynamic range. Adjust according to your project.
	Gamma	Drag the slider to adjust the gamma in the spectral display. Adjusting gamma can help you find details in the display.
	Pan	Select to pan within the spectral display by dragging. Click the down arrow to choose **Pan Time** or **Pan Frequency** to constrain panning to the horizontal or vertical axis.
	Zoom	Select to magnify the spectral display by dragging. Click the down arrow to choose **Zoom Time** or **Zoom Frequency** to constrain zooming to the horizontal or vertical axis. If you want to lock the spectrum display so the bottom of the graph remains anchored at 0 Hz when you zoom, choose **Options** > **Scales** > **Lock to 0Hz**.
	3D Displace	Select to displace the spectral display in 3D space. You can drag in the spectral display with the tool or use the edit boxes to the right of the tool to adjust the amount of displacement. Double-click the spectral display or click the **Reset View** button to restore the 2D view.

Editing tools

Choose **View** > **Toolbars** > **Tools** to show or hide the editing tools.

The editing tools on the side of the spectral display provide access to spectral information, extraction, and editing.

Button	Item	Description
	Graph	Click to display a spectrum graph in a new window. Hover over the spectrum graph to display information about power, phase, and phase velocity in various units and along time or frequency axes.
	Sampler	Click to display a sampler that allows you to view different information about the spectrum at the top of the spectrum display. Hover over the spectrum graph to see information about power, phase, and phase velocity in various units and along time or frequency axes.
	Extract: Area	Allows you to transfer an area from the mix to the selected layer. **Frequency Range**: area range in hertz. **Time Range**: time range in seconds. **Hardness**: 0% transfers with soft borders; 100% transfers a raw block.
	Extract: Frequency	Allows you to transfer a tone (with frequency tracking) from the mix to the selected layer. **Tolerance**: tracking will stop when the power is lower than this value (from the mouse position). **Time limit**: maximum time tracked, before and after mouse position. **Spread**: how many samples around the peak frequency are also transferred.

Button	Item	Description
	Extract: Harmonics	Allows you to transfer harmonics (full set of frequencies, with frequency tracking) from the mix to the selected layer. **Tolerance**: tracking will stop when the power is lower than this value (from the mouse position). **Time limit**: maximum time tracked, before and after mouse position. **Spread**: how many samples around the peak frequency are also transferred. **Rank**: specifies which frequency of the harmonic is hovered (you can change this by pressing +/-). **Harmonic Range**: number of frequencies you want to transfer.
	Extract: Noise	Allows you to transfer noise from mix to selected layer using a noise gate manually registered. In order to use this tool, you must paint a few noisy areas while in Register mode. **Register noise**: when activated, paint a few areas with noise (and noise only) so that the tool can compute a noise gate. **Reset**: reset noise gate. **Frequency Range**: area range in hertz. **Time Range**: time range in seconds. **Hardness**: 0% transfers with soft borders; 100% transfers a raw block. **Tolerance**: tolerance to the noise gate.

Button	Item	Description
	Extract: Shape	Allows you to transfer a shape (with power tracking) from the mix to the selected layer. **Minimum**: minimum power to start shape tracking (from the mouse position). **Tolerance**: tracking will stop when the power is lower than this value (from the mouse position). **Freq limit**: maximum frequency range tracked, relative to mouse position. **Time limit**: maximum time range tracked, relative to mouse position. **Spread**: how many samples around the peaks are also transferred.
	Modify: Amplify	Allows you to amplify an area in the selected layer. **Frequency Range**: area range in hertz. **Time Range**: time range in seconds. **Hardness**: 0% transfers with soft borders; 100% transfers a raw block. **Strength**: multiplier for amplification. **Use tablet pressure**: when selected, pen pressure will multiply the strength value.
	Modify: Clone	Allows you to clone an area from and to the current layer. You have to pick a source location first. **Pick**: choose a source location. **Frequency Range**: area range in hertz. **Time Range**: time range in seconds. **Hardness**: 0% transfers with soft borders; 100% transfers a raw block. **Use tablet pressure**: when activated, pen pressure will multiply the strength value. **Transpose**: transpose frequencies. When working with harmonic data, clearing this check box will maintain the structure of sound. **Source**: source layer.

Button	Item	Description
	Modify: Eraser	Allows you to erase an area in the selected layer. **Frequency Range**: area range in hertz. **Time Range**: time range in seconds. **Hardness**: 0% transfers with soft borders; 100% transfers a raw block. **Strength**: eraser multiplier. **Use tablet pressure**: when selected, pen pressure will multiply the strength value.
	Draw: Frequency	Allows you to draw a frequency in the selected layer. **Strength**: draw multiplier. **Use tablet pressure**: when selected, pen pressure will multiply the strength value.
	Draw: Noise	Allows you to draw an area of noise in selected layer. **Frequency Range**: area range in hertz. **Time Range**: time range in seconds. **Hardness**: 0% transfers with soft borders; 100% transfers a raw block. **Strength**: eraser multiplier. **Use tablet pressure**: when selected, pen pressure will multiply the strength value.

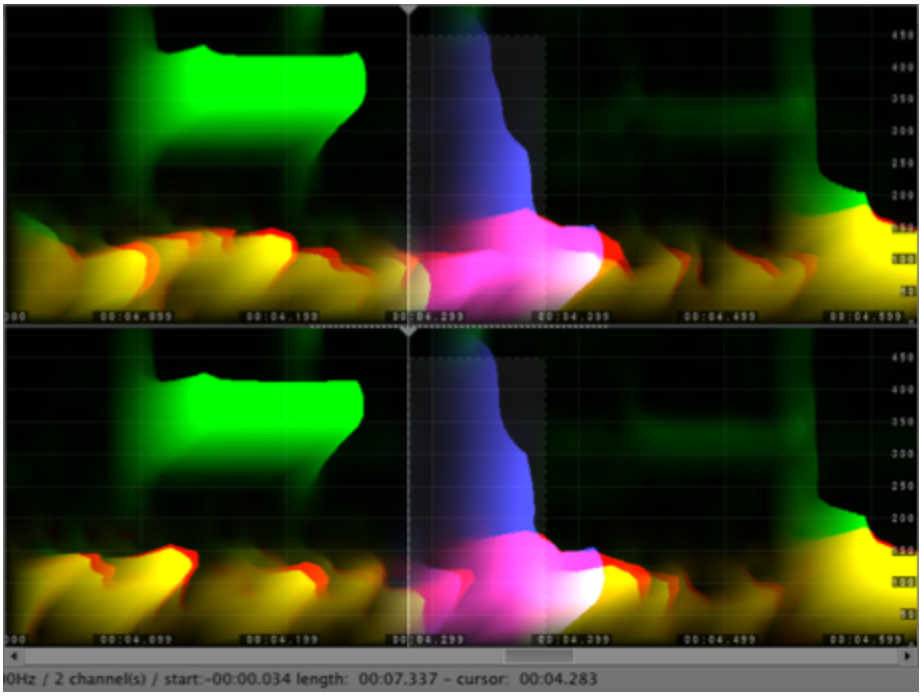
The Tool Settings toolbar

Choose **View** > **Toolbars** > **Tool Settings** to show or hide the Tool Settings toolbar.

The Tool Settings toolbar displays controls for the active editing tool. For more information, see "Editing tools" on page 15.

Spectral display

The spectral display represents the spectrum. The horizontal axis represents time, and the vertical axis represents frequency.



The global mix is displayed in green.

The selected layer is displayed in red (and appears in yellow when drawn over the global mix).

The clipboard is displayed in blue (and appears in cyan when drawn over the global mix). The clipboard is a virtual layer that holds temporary data. It is used by tools, filters, and the copy/paste buffer for small operations.

When you copy data to the clipboard, you can preview it directly by pressing Tab or by clicking the **Play** button in the toolbar and choosing **Play Clipboard**. For more information, see "The toolbars" on page 10.

If you want to change the scale of the spectrum display, choose **Options** > **Scales** and choose a scale from the submenu. The logarithmic scales — **Mel**, **Bark**, **ERB**, or **MIDI** — provide better visibility of the lower frequencies, compressing higher, less-significant frequencies at the top of the display. For more information, see "The Spectral Settings toolbar" on page 13.

If you want the spectrum display to show regularly spaced octaves, choose **Options** > **Scales** > **MIDI-logarithmic**, and then choose **Options** > **Units** > **Frequency** > **Note**.

If you to display a grid in the spectrum graph, select **Options** > **Spectrum** > **Show Grid**.

To show or hide markers and regions in the spectrum display, choose **Options** > **Spectrum** > **Show Markers and Regions**.

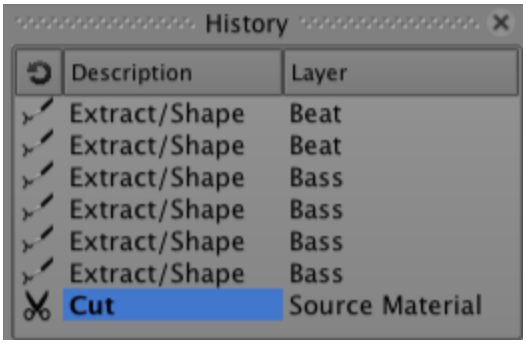
If you to apply bilinear filtering to the spectrum graph to smooth the display, select **Options** > **Spectrum** > **Bilinear Filtering**. Deselect the command if you want to see the true spectral samples.

If you want to lock the spectrum display so the bottom of the graph remains anchored at 0 Hz when you zoom, choose **Options** > **Scales** > **Lock to 0Hz**.

The History panel

The History panel allows you to see a list of the actions you've performed.

Choose **View** > **Panels** > **History** to show or hide the History panel.



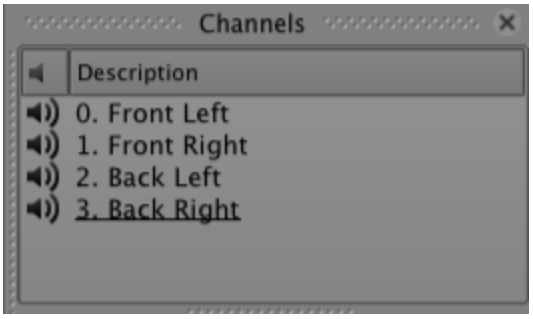
The list contains a description of each action and the layer where the action was applied.

The latest action is always displayed at the bottom of the list.

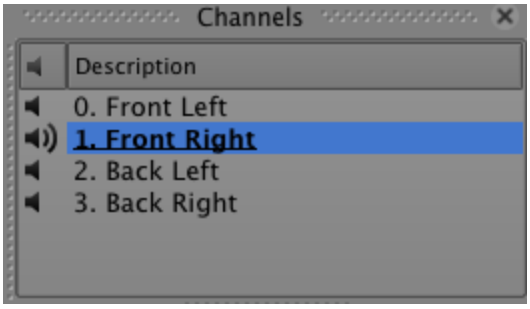
The Channels panel

The Channels Panel allows you to enable channels in multichannel audio files.

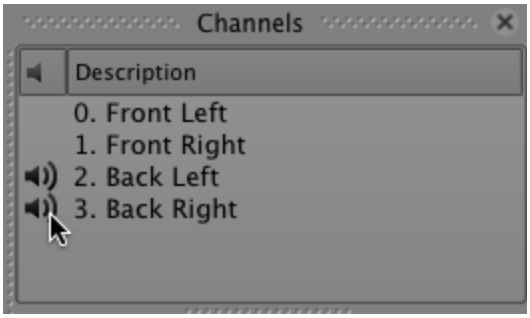
Choose **View** > **Panels** > **Channels** to show or hide the History Panel.



When you select a channel, only the selected channel will be displayed in the spectrum display.



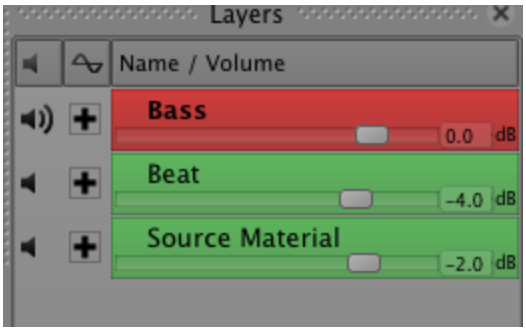
If you want to exclude channels from playback, click in the left column to hide the speaker icon. To unmute a channel, click in the left column again to show the speaker icon.



The Layers panel

The Layers panel allows you to manage the layers in your project. You can activate/deactivate layers, change phase, adjust volume, duplicate, delete, move, and merge layers.

Choose **View** > **Panels** > **Layers** to show or hide the Layers panel



Selecting a layer

Click a layer to select it. The selected layer is displayed in red in the Layers panel and in the spectrum display. To clear a layer selection, click an empty portion of the Layers panel or press Shift+Tab.

Activating a layer

Only active layers are displayed in the spectrum display and included in the global mix when you play your project.

If you want to deactivate a layer, click in the left column to hide the speaker icon. To activate a layer, click in the left column again to show the speaker icon.

Changing a layer's phase

When you add a new layer, it's mixed with the other layers in your project.

Click the icon in the **Phase** column to invert the phase and switch between additive and subtractive mode.

Renaming a layer

The file name is used for the layer name by default. Perform either of the following actions to edit a layer's name:

- Double-click the layer name in the Layers panel and type a new name.
- Right-click (Windows) or Control-click (Mac) a layer and choose **Properties** from the shortcut menu. The Properties dialog displays information about the layer and allows you to specify a new name.

Adjusting layer volume

Drag a fader in the Layers panel to adjust a layer's volume in the global mix.

Duplicating a layer

Right-click (Windows) or Control-click (Mac) a layer and choose **Duplicate** from the shortcut menu. The new layer is added to the top of the list in the Layers panel.

Deleting a layer

Right-click (Windows) or Control-click (Mac) a layer and choose **Delete** from the shortcut menu.

Calibrating a layer

Right-click (Windows) or Control-click (Mac) a layer and choose **Calibrate** from the shortcut menu to display the Calibrate dialog. You can use the Calibrate dialog to calibrate the power of the selected layer.

Moving a layer

Right-click (Windows) or Control-click (Mac) a layer and choose **Move Up** or **Move Down** from the shortcut menu.

Merging layers

Right-click (Windows) or Control-click (Mac) a layer and choose **Merge Down** from the shortcut menu to merge the layer with the next layer in the list..

Advanced Settings

Choose **View** > **Advanced Settings** to open the Advanced Settings dialog.

Item	Description
Session Path	Displays the path to the folder where SpectraLayers will save temporary data. Click the path to browse to a new folder. The **max days** control indicates the number of days that temporary data will be maintained in the temporary folder. Click the **Clean Sessions** button to clear all temporary data.
Logs Path	Displays the path to the folder where SpectraLayers will save log files. Click the path to browse to a new folder. The **max logs** control indicates the number of logs that will be maintained in the folder. Click the **Clear Logs** button to clear all log files.
Max Recent Projects	Use the spinner control to indicate the number of projects that should be available in the File menu.

Item	Description
Max History Actions	Use the spinner control to indicate the number of actions that will be displayed in the History panel. For more information, see "The History panel" on page 20.
Colors: ■ Grid ■ Selected Area ■ Markers ■ Regions ■ Mix ■ Selected Layer ■ Clipboard	Allows you to change the color that will be used to display the mix, selected layer, and clipboard in the spectrum display. Click a button to display a color picker that you can use to select a new color for each element. Click **Reset Colors** to restore the default SpectraLayers color scheme.

Chapter 3

Working with projects

A SpectraLayersproject file (.slp or .slx) saves the relevant information about your source media: file locations, layers, filters, and edit.

A project file is not a multimedia file. It contains pointers to the original source files, so you can edit your project nondestructively — you can be creative without worrying about corrupting your source files.

Creating a new project

The first step in creating your masterpiece is to create a SpectraLayers project file.

1. From the File menu, choose **New Project**. The New Project dialog is displayed.
2. Use the New Project dialog to set your project properties.
    - **Import Layer**: Allows you to import an audio file to a layer in a new project.
    - **New Layer**: Creates a new, blank project.
    - **Open Project**: Allows you to select an existing SpectraLayers project file.

Opening a project

From the File menu, choose **Open Project** to open a SpectraLayers project.

1. From the File menu, choose **Open Project**. The Open dialog box is displayed.
2. Select a file in the browse window or type a name in the **File name** box.
3. Click **Open**. If you have not saved the current project, you will be prompted to save your changes.

Importing a layer

From the File menu, choose **Import Layer** to add an audio file as a new layer in your SpectraLayers project.

1. From the File menu, choose **Import Layer**. The Import File dialog box is displayed.
2. Select a file in the browse window or type a name in the **File name** box.
3. Click **Open**. The new file is added to your project and is selected in the Layers panel.

Recording to a layer

You can use the **Record** button on the toolbar to record audio to a selected layer.

1. Create a new SpectraLayers project or open an existing project file.

   For more information, see "Creating a new project" on page 25 or "Opening a project" on page 25.

2. In the Layers Panel, click the layer where you want to record data (or create a new layer and select it). This is your target layer.

   The selected layer is displayed in red.

3. Choose **Options** > **Devices** > **Record** and then choose the input you want to record.

4. Position the cursor in the spectral display at the position where you want recording to begin. If you create a selection, audio will only be recorded to the selected time/frequency range.

   For more information, see "Selecting spectral data" on page 35.

5. **Click the Record button** **. During recording, the button is displayed as a Pause button so you can pause and resume recording.**

Rendering a layer

From the File menu, choose **Render Layer** to render the selected layer as an audio file.

1. Select a layer in the Layers panel.
2. **From the File menu, choose Render Layer. The Export File dialog box is displayed.**
3. Use the Export File dialog to choose the folder, file name, and file format you want to use to save your layer.
4. Click **Save**.

Rendering your mix

From the File menu, choose **Render Mix** to mix your project's layers to a new audio file.

1. **From the File menu, choose Render Mix. The Export File dialog box is displayed.**
2. Use the Export File dialog to choose the folder, file name, and file format you want to use to save your rendered mix.
3. Click **Save**.

Editing with Sound Forge Pro

From the Process menu, choose **Edit in Sound Forge Pro** to open the selected layer in Sound Forge Pro 11. When you're finished editing, your changes will be updated in SpectraLayers.

From the Process menu, choose **Send to Sound Forge Pro** to open the selected layer in Sound Forge Pro 11. When you're finished editing, you can save the edited layer from Sound Forge Pro.

If Sound Forge Pro is not installed, the command is not available. For more information, please see http://www.sonycreativesoftware.com/soundforge.

Editing a layer in Sound Forge Pro

1. Select a layer.
2. If you want to edit only a portion of the layer, create a time or frequency selection. Only the selected data will be opened in Sound Forge Pro. For more information, see "Selecting spectral data" on page 35.
3. From the Process menu, choose **Edit in Sound Forge Pro**. Sound Forge Pro starts, and the selected layer is loaded as a new data window.
4. Edit your file as needed in Sound Forge Pro. For information about using Sound Forge Pro, please refer to the application help.
5. When you're done editing, close the data window in Sound Forge Pro. You'll be prompted to import your changes back to SpectraLayers. Click Yes, and the layer in your SpectraLayers project is updated to reflect any changes.

Sending a layer to Sound Forge Pro

1. Select a layer.
2. From the Process menu, choose **Send to Sound Forge Pro**. Sound Forge Pro starts, and the selected layer is loaded as a new data window.
3. If you want to edit only a portion of the layer, create a time or frequency selection. Only the selected data will be opened in Sound Forge Pro. For more information, see "Selecting spectral data" on page 35.
4. Edit your file as needed in Sound Forge Pro. For information about using Sound Forge Pro, please refer to the application help.
5. When you're done editing, you can save the Sound Forge Pro data window as a new file or Sound Forge Pro Project.

Saving a project

From the File menu, choose **Save** to save changes to the current SpectraLayers project (.slp). When a SpectraLayers project is saved, all of the layers and adjustments are saved in this project file.

If you want to keep the previous version of your project before you made changes, use the **Save As** command to save the new version of the project with a new name. For more information, see "Saving and renaming a project (Save As)" on page 28.

Saving and renaming a project (Save As)

From the File menu, choose **Save As** to save the current project to a different location or with a new name.

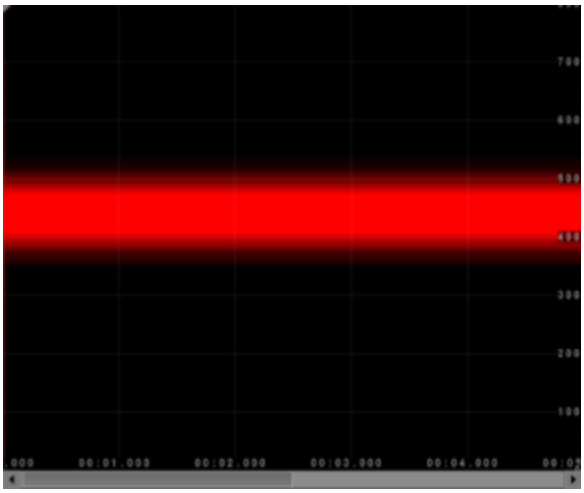
1. From the File menu, choose **Save As**.
2. Use the Save Project dialog to choose the folder, file name, and file format you want to use to save your project.
3. Click the **Save** button.

Chapter 4

Viewing and selecting spectral data

Frequency, harmonics, and noise

In a spectral view, all sound is represented as a sum of frequencies with different amplitudes and phase. So if you record a pure tone (such as A4, 440Hz), you will see a straight horizontal line in the spectrum at frequency 440 Hz. However, pure tones are typically generated by electronic devices or very specific instruments.



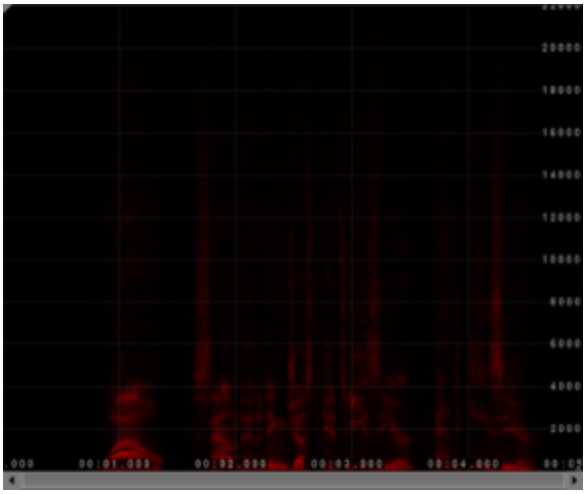
440 Hz sine wave

Voice and musical instruments are (mostly) composed of harmonics: several pure tones with different amplitudes and different frequencies. These frequencies follow physical rules: they are a multiple of the base frequency. If a piano plays A4, you will have a tone at 440 Hz plus a tone at 440x2=880 Hz with a different amplitude, plus a tone at 440x3=1320 Hz, etc.

Finally, noise is everything that cannot be described as pure tones. In the spectrum, noise appears as clouds of random dots across time and frequencies.

Voice data

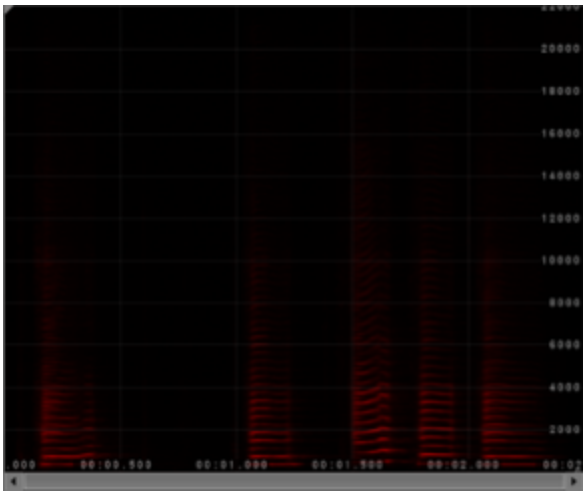
Voice is mostly harmonics because all vowels sounds use pure tones ("a", "e", etc). However, most consonants ("t", "k", etc) are noise. So when you extract a full word you have to deal both with harmonic and noise sounds.



A voiceover recording

Instruments

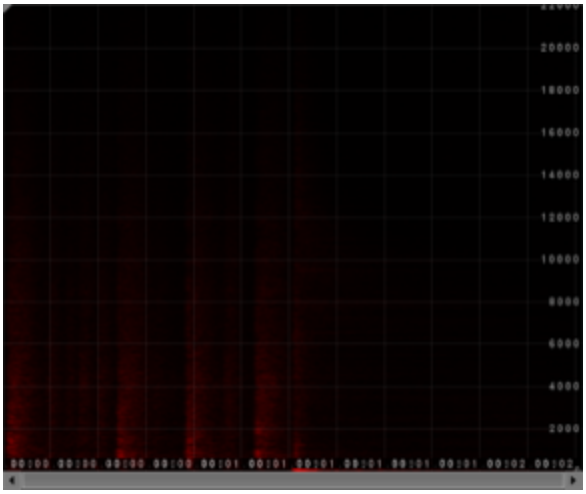
- Classic instruments such as the piano, violin, trumpet, etc produce harmonic sounds.

  A recorded saxophone

- Some synthetic instruments may produce unharmonic sounds (harmonic-like, but with float frequency multiplier).

- Percussive instruments such as drums produce noise.



A drum fill

Sounds from nature and engine sounds

- The sea and the wind are noise.
- Something that breaks or crashes is noise.
- Engine sounds can be noise or harmonics.

Moving and scaling harmonics vertically

While moving or scaling noise or pure tones does not change their nature, moving harmonics breaks the harmonic rules.

Moving harmonics adds a constant frequency: if a piano plays A4 (see above) and we move this sound by 100 Hz, the 3 first frequencies will be 440+100=540 Hz, 880+100=980 Hz and 1320+100=1420 Hz.

1420 Hz and 980 Hz are not multiples of 540 Hz, which means the sound will be unharmonic (it will not sound like a piano note anymore).

To preserve the harmonics, we need to scale (multiply) the frequencies. Scaling A4 by 1.2 produces 440 x 1.2=528 Hz, 880 Hz x 1.2=1056 Hz, 1320 x 1.2=1584 Hz.

1584 Hz=528 Hz x 3 and 1056 Hz=528 Hz x 2, so we preserved harmonics and the recording will still sound like a piano.

Formant and time envelope

The formant is the frequency signature of a sound, and it applies both to harmonic and noise sounds. It is the envelope of amplitudes across frequencies.

A person's voice sounds different from another person's voice and sounds different from a piano because the harmonics are different. If they all sing and play A4, they will all have the first 3 frequencies 440 Hz, 880 Hz and 1320 Hz (see above), but with different amplitudes each. This rule also applies to noise, where the random dots are shaped by different amplitudes.

Finally the time envelope also act a signature across time. Let's take a violin: it will sound very different drawing a bow across a string or plucking it, although the frequency envelope will be the same. The way amplitudes change over time is fully part of the signature of a sound whether the sound is harmonic or noise.

If you scale a sound too much (by a factor of 2 and above, or 1/2 and below), it will not sound exactly as played by the same source, because the formant and time envelope were scaled too.

Displaying spectral information

The Info tools on the left side of the SpectraLayers window allow you to analyze the content of the spectrum.

Using the graph

1. Use the Channels Panel and Layers Panel to select the portion of your project that you want to analyze.

   For more information, see "The Channels panel" on page 21 and "The Layers panel" on page 22.

2. Click the **Graph** button .

   The Graph window is displayed, and the mouse pointer changes to a sampler .

3. As you move the sampler over the spectrum, the Graph window displays information about the cursor position.

You can use the drop-down lists below the graph to choose the information you want to display in the graph.

You can display **Power dB**, **Power Value**, **Phase Radian**, **Phase Degree**, or **Relative Phase Velocity** on the Y axis.

You can choose to display **Frequency** or **Time** on the X axis.

You can use the **time range** and **freq range** controls to limit the range displayed in the graph.

Using the sampler

1. Use the Channels Panel and Layers Panel to select the portion of your project that you want to analyze.

   For more information, see "The Channels panel" on page 21 and "The Layers panel" on page 22.

2. Click the **Sampler** button .

   The Sampler toolbar is displayed above the spectral display, and the mouse pointer changes to a sampler .

   As you move the sampler over the spectrum, the Sampler toolbar displays information about the cursor position.

   You can use the drop-down list in the Sampler toolbar to choose the information you want to display in the graph:

   - Power dB
   - Power Value
   - Power Percent
   - Phase Radian
   - Phase Degree
   - Phase Velocity Radian/Window
   - Phase Velocity Degree/Window
   - Phase Velocity Hertz
   - Peak Power dB
   - Peak Power Value
   - Peak Bin
   - Peak Hertz
   - Complex Value

Selecting spectral data

You can use the Select , Move , and Scale tools in the toolbar to select data in the spectral display.

Creating a selection

With the Select tool , click and drag in the spectral display to create a rectangular selection.

 Tips:

- Press T to select a time range that includes the full frequency range.
- Press F to select a frequency range that spans the full time span of the spectral display.

Moving a selection

After creating a selection, you can use the Move tool to move your selection.

 Tips:

- Press Alt+Shift+T to move a selection along the timeline without changing the frequency selection.
- Press Alt+Shift+F to move a selection along the frequency axis without changing the time selection.

Scaling a selection

After creating a selection, you can use the Scale tool to scale your selection.

 Tips:

- Press Ctrl+Alt+T to scale a time selection without changing the frequency selection.
- Press Ctrl+Alt+F to scale a frequency selection without changing the time selection.
- Press Ctrl+Alt+P to scale the selection proportionally.

Clearing a selection

Choose **Edit** > **Unselect All** (or press Esc) to clear the current selection.

Chapter 5

Extracting spectral data

You can use the extract tools to copy spectral data from the global mix to the selected layer.

Extracting spectral data allows you to isolate and manipulate sound. For example, if you created a field recording that was interrupted by an unwanted sound in the background, you could extract the unwanted sound to a new layer to remove it from the global mix.

Extracting an area

Extracting an area allows you to transfer portions of the global mix to the selected layer.

1. Create a new SpectraLayers project or open an existing project file.

   For more information, see "Creating a new project" on page 25 or "Opening a project" on page 25.

2. In the Layers Panel, click the layer where you want to extract data (or create a new layer and select it). This is your target layer.

   The selected layer is displayed in red.

3. Click the **Extract Area** button . The cursor is displayed as a target.

4. Click (or drag) in the spectral display to extract spectral data to from the global mix to the selected layer.

   The selection is bound to the area you click in the spectral display. You can use the **freq range (Hz)**, **time range (sec)**, and **hardness (%)** controls above the spectral display to adjust the selection area.

   - **freq range (Hz)**: sets the range of the extraction area.
   - **time range (sec)**: sets the time range of the extraction.
   - **hardness (%)**: sets the shape of the extraction area — 100% extracts a raw block of data; 0% extracts a block with feathered edges.

   The selection is drawn in red in the spectral display and is drawn in yellow when drawn over the global mix.

5. Preview your extraction:

   - To hear only your extracted data, select the target layer and click the **Play** button in the toolbar.
   - To hear the global mix, click below the last layer in the Layers panel so no layer is selected and click the **Play** button in the toolbar.

Extracting a frequency

Extracting frequencies allows you to transfer a tone (with frequency tracking) from the global mix to the selected layer.

1. Create a new SpectraLayers project or open an existing project file.

   For more information, see "Creating a new project" on page 25 or "Opening a project" on page 25.

2. In the Layers Panel, click the layer where you want to extract data (or create a new layer and select it). This is your target layer.

   The selected layer is displayed in red.

3. Click the **Extract Frequency** button . The cursor is displayed as a target.

4. Click (or drag) in the spectral display to extract spectral data to from the global mix to the selected layer.

   The selection is bound to the frequency you click in the spectral display. You can use the **tolerance (dB)**, **time limit (sec)**, and **spread (bin)** controls above the spectral display to adjust the range of data that will be extracted.

   - **tolerance (dB)**: sets the lowest power that will be extracted at the mouse position.
   - **time limit (sec)**: sets the time before and after the mouse position that will be extracted.
   - **spread (bin)**: sets the number of bins (spectrum samples) around the peak frequency that will be extracted.

   The selection is drawn in red in the spectral display and is drawn in yellow when drawn over the global mix.

5. Preview your extraction:

   - To hear only your extracted data, select the target layer and click the **Play** button in the toolbar.
   - To hear the global mix, click below the last layer in the Layers panel so no layer is selected and click the **Play** button in the toolbar.

Extracting harmonics

Extracting harmonics allows you to transfer a full set of frequencies (with frequency tracking) from the global mix to the selected layer.

1. Create a new SpectraLayers project or open an existing project file.

   For more information, see "Creating a new project" on page 25 or "Opening a project" on page 25.

2. In the Layers Panel, click the layer where you want to extract data (or create a new layer and select it). This is your target layer.

   The selected layer is displayed in red.

3. Click the **Extract Harmonics** button . The cursor is displayed as a target.

4. Click (or drag) in the spectral display to extract spectral data to from the global mix to the selected layer.

   The selection is bound to the frequency you click in the spectral display. You can use the **tolerance (dB)**, **time limit (sec)**, **spread (bin)**, **harmonic rank**, and **harmonics** controls above the spectral display to adjust the range of data that will be extracted.

   - **tolerance (dB)**: sets the lowest power that will be extracted at the mouse position.
   - **time limit (sec)**: sets the time before and after the mouse position that will be extracted.
   - **spread (bin)**: sets the number of bins (spectrum samples) around the peak frequency that will be extracted.
   - **harmonic rank**: sets the frequency of the harmonic you're hovering over (you can change this by pressing +/-).
   - **harmonics**: sets the number of frequencies you want to transfer.

   The selection is drawn in red in the spectral display and is drawn in yellow when drawn over the global mix.

5. Preview your extraction:

   - To hear only your extracted data, select the target layer and click the **Play** button in the toolbar.
   - To hear the global mix, click below the last layer in the Layers panel so no layer is selected and click the **Play** button in the toolbar.

Extracting noise

Extracting noise allows you to transfer noise from the global mix to the selected layer.

SpectraLayers provides two methods of extracting noise: you can use the **Extract Noise** tool to register noise and manually move it to a new layer, or you can use the **Extract Noise** tool to register noise and then choose **Process** > **Extract** > **Noise** to move the noise to a new layer.

Extract noise from a range of data

1. Create a new SpectraLayers project or open an existing project file.

   For more information, see "Creating a new project" on page 25 or "Opening a project" on page 25.

2. In the Layers Panel, click the layer where you want to extract data (or create a new layer and select it). This is your target layer.

   The selected layer is displayed in red.

3. Click the **Extract Noise** button . The cursor is displayed as a target.

4. Register the noise in your audio to compute a noise gate:

   a. Click the **Register Noise** button above the spectral display.

   b. Click noisy areas in the spectral display to identify the noise you want to remove.

   c. Click the **Register Noise** button again to turn it off when you're done identifying noise.

5. Extract the noise to your new layer:

   a. Verify the layer where you want to extract noise is selected.

   b. With the **Extract Noise** button selected, click the portions of the spectrum that you registered in step 4 to transfer them to your new layer.

   c. Click noisy areas in the spectral display to identify the noise you want to remove.

   d. You can use the **freq range (Hz)**, **time range (sec)**, **hardness (%)**, and **tolerance (dB)** controls above the spectral display to adjust the range of data that will be extracted.

      - **freq range (Hz)**: sets the range of the extraction area.
      - **time range (sec)**: sets the time range of the extraction.
      - **hardness (%)**: sets the shape of the extraction area — 100% extracts a raw block of data; 0% extracts a block with feathered edges.
      - **tolerance (dB)**: sets the threshold of the noise gate.

6. The selection is drawn in red in the spectral display and is drawn in yellow when drawn over the global mix.

7. In the Layers panel, click the phase button to invert the phase of your noise layer: .

   - To hear only your extracted data, select the target layer and click the **Play** button in the toolbar.
   - To hear the global mix, click below the last layer in the Layers panel so no layer is selected and click the **Play** button in the toolbar.

Extract noise from a layer

1. Create a new SpectraLayers project or open an existing project file.

   For more information, see "Creating a new project" on page 25 or "Opening a project" on page 25.

2. In the Layers Panel, click the layer where you want to extract data (or create a new layer and select it). This is your target layer.

   The selected layer is displayed in red.

3. Click the **Extract Noise** button . The cursor is displayed as a target.
4. Register the noise in your audio to compute a noise gate:
   a. Click the **Register Noise** button above the spectral display.
   b. Click noisy areas in the spectral display to identify the noise you want to remove.
   c. Click the **Register Noise** button again to turn it off when you're done identifying noise.
5. Extract the noise to your new layer:
   a. Verify the layer where you want to extract noise is selected.
   b. Choose **Process** > **Extract** > **Noise** to extract the noise to your new layer.
6. The selection is drawn in red in the spectral display and is drawn in yellow when drawn over the global mix.
7. In the Layers panel, click the phase button to invert the phase of your noise layer: .

   - To hear only your extracted data, select the target layer and click the **Play** button in the toolbar.
   - To hear the global mix, click below the last layer in the Layers panel so no layer is selected and click the **Play** button in the toolbar.

Expanding peaks

Expanding peaks is useful after extracting spectral data to a new layer. If your extraction didn't capture all the data you needed, expanding peaks will expand the extraction area around each peak frequency to include additional frequencies.

1. Create a new SpectraLayers project or open an existing project file.

   For more information, see "Creating a new project" on page 25 or "Opening a project" on page 25.

2. Use the extract tools to extract spectral data to a new layer.

   For more information, see "Extracting spectral data" on page 37.

3. Select the layer where you extracted data.
4. Choose **Process** > **Extract** > **Expand Peaks**. The Expand Peaks dialog is displayed.
5. Adjust the controls in the Expand Peaks dialog to the layer.
   - Use the **tolerance** control to set the minimum peak level that will be expanded.
   - Use the **hor. exp.** control to set the number of horizontal bins you want to expand the selection.
   - Use the **ver. exp.** control to set the number of vertical bins you want to expand the selection.

   Click the **Preview** button to preview your expanded selection.
6. Click the **Apply** button to update the extraction layer.

Extracting shapes

Extracting shapes allows you to transfer a shape (with power tracking) from the mix to the selected layer.

1. Create a new SpectraLayers project or open an existing project file.

   For more information, see "Creating a new project" on page 25 or "Opening a project" on page 25.

2. In the Layers Panel, click the layer where you want to extract data (or create a new layer and select it). This is your target layer.

   The selected layer is displayed in red.

3. Click the **Extract Shape** button . The cursor is displayed as a target.

4. Click (or drag) in the spectral display to extract spectral data to from the global mix to the selected layer.

   The selection is bound to the frequency you click in the spectral display. You can use the **minimum (dB)**, **tolerance (dB)**, **freq limit (Hz)**, **time limit (sec)**, and **spread (bin)** controls above the spectral display to adjust the range of data that will be extracted.

   - **minimum (dB)**: sets the minimum power to start shape tracking (from the mouse position).
   - **tolerance (dB)**: tracking will stop when the power is lower than this value (from the mouse position).
   - **freq limit (Hz)**: sets the maximum frequency range tracked, relative to mouse position.
   - **time limit (sec)**: sets the maximum time range tracked, relative to mouse position.
   - **spread (bin)**: sets the number of bins (spectrum samples) around the peak frequency that will be extracted..

   The selection is drawn in red in the spectral display and is drawn in yellow when drawn over the global mix.

5. Preview your extraction:

   - To hear only your extracted data, select the target layer and click the **Play** button in the toolbar.
   - To hear the global mix, click below the last layer in the Layers panel so no layer is selected and click the **Play** button in the toolbar.

Chapter 6

Modifying spectral data

You can use the modify tools to manipulate spectral data in a layer.

Amplifying spectral data

Amplifying an area allows you to increase the volume of a portion of the selected layer.

1. Create a new SpectraLayers project or open an existing project file.

   For more information, see "Creating a new project" on page 25 or "Opening a project" on page 25.

2. In the Layers Panel, click the layer where you want to amplify data.

   The selected layer is displayed in red.

3. Click the **Amplify** button . The cursor is displayed as a target.

4. Use the **power (dB)** control above the spectral display to set the amount of gain that the **Amplify** tool will apply.

5. Click (or drag) in the spectral display to amplify spectral data. The selection is drawn in a brighter color, and you can use **3D Displace** mode mode to see the peaks increase in the 3D space.

   The selection is bound to the area you click in the spectral display. You can use the **freq range (Hz)**, **time range (sec)**, **hardness %**, and **use tablet pressure** controls above the spectral display to adjust the selection area.

   - **freq range (Hz)**: sets the range of the selection area.
   - **time range (sec)**: sets the time range of the selection.
   - **hardness (%)**: sets the shape of the selection area — 100% selects a raw block of data; 0% selects a block with feathered edges.
   - **use tablet pressure**: select the button ( ) to use pen pressure to multiply the **power** value when creating a selection.

Cloning spectral data

Cloning an area allows you to duplicate data within a layer.

1. Create a new SpectraLayers project or open an existing project file.

   For more information, see "Creating a new project" on page 25 or "Opening a project" on page 25.

2. In the Layers Panel, click the layer that contains the data you want to clone.

   The selected layer is displayed in red.

3. Click the **Clone** button . The cursor is displayed as a target.

4. Click the **pick** button above the spectral display — or hold Alt (Windows) or Option (Mac) — and click the spectral display to pick the source data that you want to clone.

   The selection is bound to the area you click in the spectral display. You can use the controls above the spectral display to adjust the selection area.

   - **freq range (Hz)**: sets the range of the selection area.
   - **time range (sec)**: sets the time range of the selection.
   - **hardness (%)**: sets the shape of the selection area — 100% selects a raw block of data; 0% selects a block with feathered edges.
   - **use tablet pressure**: select the button ( ) to use pen pressure to multiply the **power** value when creating a selection.
   - **transpose**: select this check box to transpose frequencies. You can clear this check box when working with harmonic data to keep the structure of sound.
   - **source**: choose the source layer that you want to clone.

5. Click (or drag) in the spectral display to draw the cloned data.

Erasing spectral data

Erasing an area allows you to simply remove data from a layer.

1. Create a new SpectraLayers project or open an existing project file.

   For more information, see "Creating a new project" on page 25 or "Opening a project" on page 25.

2. In the Layers Panel, click the layer that contains the data you want to erase.

   The selected layer is displayed in red.

3. Click the **Eraser** button . The cursor is displayed as a target.

4. Click (or drag) in the spectral display to erase data.

   You can use the controls above the spectral display to adjust the erased area.

   - **freq range (Hz)**: sets the range of the area.
   - **time range (sec)**: sets the time range of the erased area.
   - **hardness (%)**: sets the shape of the selection area — 100% erases a raw block of data; 0% erases a block with feathered edges.
   - **power**: sets the amount of attenuation that will be applied by the eraser.
   - **use tablet pressure**: select the button ( ) to use pen pressure to multiply the **power** value when erasing.
   - **transpose**: select this check box to transpose frequencies. You can clear this check box when working with harmonic data to keep the structure of sound.
   - **source**: choose the source layer that you want to clone.

Chapter 7

Drawing spectral data

You can use the draw tools to draw a frequency into the selected layer.

Drawing a frequency

1. Create a new SpectraLayers project or open an existing project file.

   For more information, see "Creating a new project" on page 25 or "Opening a project" on page 25.

2. In the Layers Panel, click the layer where you want to draw data.

   The selected layer is displayed in red.

3. Click the **Frequency** button . The cursor is displayed as a target.

4. Click (or drag) in the spectral display to draw frequencies in the spectral display.

   You can use the **power (dB)** and **use tablet pressure** controls above the spectral display to adjust the drawn frequency.

   - **power**: sets the level of drawn frequencies.
   - **use tablet pressure**: select the button ( ) to use pen pressure to multiply the **power** value when drawing frequencies.

Drawing noise

1. Create a new SpectraLayers project or open an existing project file.

   For more information, see "Creating a new project" on page 25 or "Opening a project" on page 25.

2. In the Layers Panel, click the layer where you want to draw noise.

   The selected layer is displayed in red.

3. Click the **Noise** button . The cursor is displayed as a target.

4. Click (or drag) in the spectral display to draw noise in the spectral display.

   You can use the controls above the spectral display to adjust the erased area.

   - **freq range (Hz)**: sets the range of the noise.
   - **time range (sec)**: sets the time range of the noise.
   - **hardness (%)**: sets the shape of the noise — 100% paints a raw block of data; 0% paints a block with feathered edges.
   - **power**: sets the level of the noise.
   - **use tablet pressure**: select the button ( ) to use pen pressure to multiply the **power** value when painting.

Chapter 8

Processing spectral data

You can use the commands on the Process menu to manipulate spectral data

Generating a frequency

1. Create a new SpectraLayers project or open an existing project file.

   For more information, see "Creating a new project" on page 25 or "Opening a project" on page 25.

2. In the Layers Panel, click the layer where you want generate data.

   The selected layer is displayed in red.

3. Choose **Edit** > **Set Selection** to create a time/frequency selection in the spectral display.
4. Choose **Process** > **Generate** > **Frequency**. The Generate Frequency dialog is displayed.
5. Use the **power (dB)** control to set the level of the generated signal.
6. Use the **freq (Hz)** control to set the frequency of the generated signal.

   Click the **Preview** button to preview your generated signal. During preview, only the generated signal is played, and the generated signal is drawn over the spectral display.

7. **Click the Apply button to mix the generated frequency with the selected layer.**

Generating white noise

1. Create a new SpectraLayers project or open an existing project file.

   For more information, see "Creating a new project" on page 25 or "Opening a project" on page 25.

2. In the Layers Panel, click the layer where you want generate noise.

   The selected layer is displayed in red.

3. Choose **Edit** > **Set Selection** to create a time/frequency selection in the spectral display.
4. Choose **Process** > **Generate** > **White Noise**. The Generate White Noise dialog is displayed.
5. Use the **power (dB)** control to set the level of the generated noise.

   Click the **Preview** button to preview your generated noise. During preview, only the noise is played, and the noise is drawn over the spectral display.

6. **Click the Apply button to mix the generated noise with the selected layer.**

Mixing channels

1. Create a new SpectraLayers project or open an existing project file.

   For more information, see "Creating a new project" on page 25 or "Opening a project" on page 25.

2. In the Layers Panel, click the layer that contains the channels you want to mix.

   The selected layer is displayed in red.

3. Choose **Process** > **Mix** > **Channels**. The Mix Channels dialog is displayed.

4. Adjust the faders in the Mix Channels dialog to mix the layer's channels as desired.

   The Mix Channels dialog displays a tab for each channel. Select a tab and use the channel faders to adjust the mix for that channel.

   Click the **Preview** button to preview your mix. During preview, the new mix is played, and the spectral display is updated to reflect the new mix.

5. Click the **Apply** button to update the layer's channel mix.

Mixing gamma/level/offset

1. Create a new SpectraLayers project or open an existing project file.

   For more information, see "Creating a new project" on page 25 or "Opening a project" on page 25.

2. In the Layers Panel, click the layer that you want to adjust.

   The selected layer is displayed in red.

3. Choose **Process** > **Mix** > **Level Gamma Offset**. The Level Gamma Offset dialog is displayed.

4. Adjust the faders in the Level Gamma Offset dialog adjust the layer.

   - Drag the **level (dB)** fader to adjust the overall power of the audio in the spectral display.
   - Drag the **gamma** slider to adjust dark tones in the spectral display. Adjusting gamma works on the spectral display in much the same way a compressor works on audio signals.
   - Drag the **offset** slider to adjust midtones in the spectral display. Adjusting offset allows you to cut low-power frequencies.

   Click the **Preview** button to preview your mix. During preview, the new mix is played, and the spectral display is updated to reflect the new mix.

5. Click the **Apply** button to update the layer.

Spectral casting and spectral molding

Spectral casting and spectral molding allow you to apply the frequency content across layers.

Imagine you're working on a mix in which the bass guitar is causing the kick drum to become lost in the mix. You could use spectral molding to remove the shared frequencies from the bass guitar, creating space for the kick drum to stand out.

Casting a layer

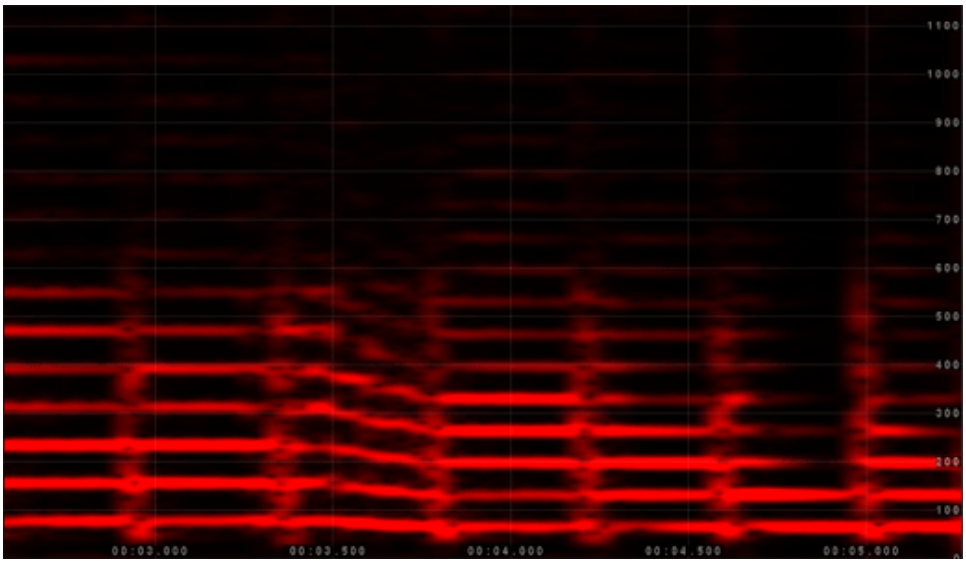
In spectral casting, the frequency content of the global mix leaves an impression in the selected layer in the same way your foot leaves an impression in the sand when you walk on the beach.

1. Load the layers you want to process. For more information, see "Importing a layer" on page 25.

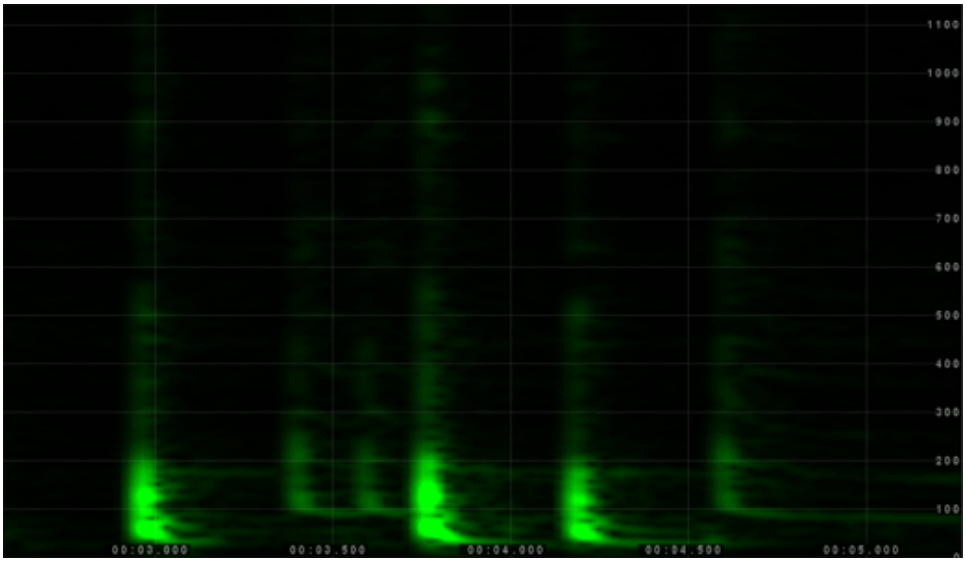
   Casting operates on the global mix. If your current project contains layers you want to exclude from the casting process, deactivate those layers in the Layers panel. For more information, see "The Layers panel" on page 22.

2. Adjust the spectrum display until the harmonics are clearly visible. For more information, see "The Spectral Settings toolbar" on page 13 and "The Spectral Display toolbar" on page 14.
3. In the Layers panel, select the layer to which you want to cast peaks.
4. Choose **Process** > **Mix** > **Cast Peaks**. The Cast Peaks dialog is displayed.
5. Select the **Cast selected layer** radio button.
6. Type a value in the **ratio** box (or use the spin control) to set the gain that will be applied to the cast peaks.
7. Type a value in the **time margin** and **freq margin** boxes (or use the spin controls) to control the time and frequency range that is used when casting peaks. Increasing the margin settings produces softer (feathered) peaks.
8. Click **Preview** to preview the current dialog settings and adjust the settings as needed.
9. Click **Apply** to cast peaks with the current dialog settings.

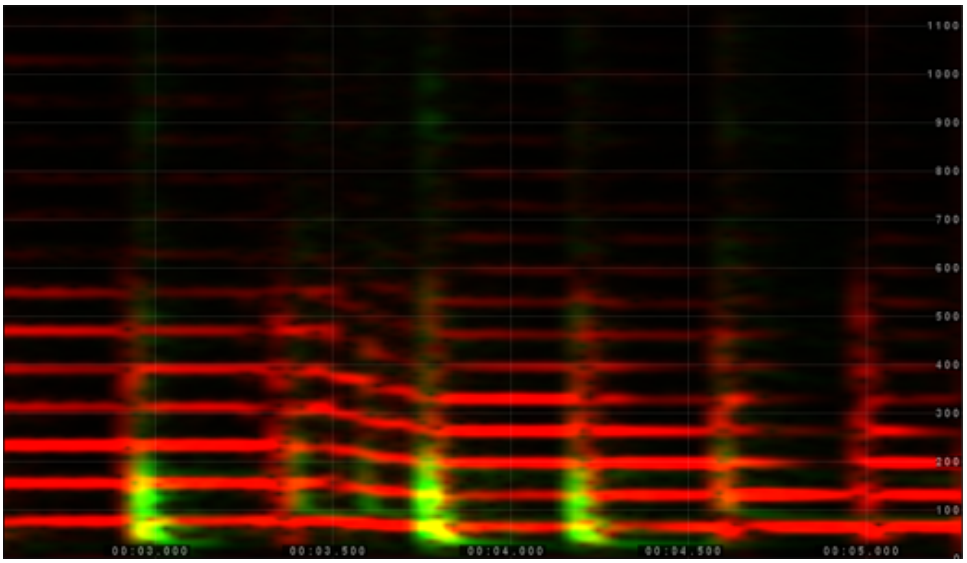
To demonstrate the effect of casting with our bass guitar/kick drum example, let's start with a simple two-layer project. The following image shows the spectrum of the bass guitar layer. This layer is selected, so its spectrum is displayed in red:



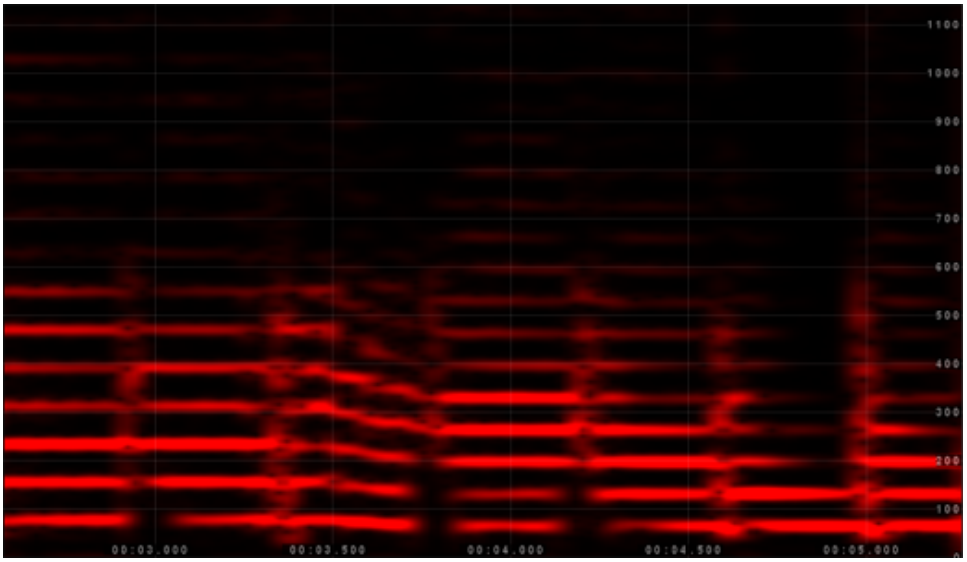
The following image shows the spectrum of the kick drum (the kick drum is part of the global mix, so it is displayed in green):



The following image shows the mix of the kick drum and bass guitar. The bass guitar layer is selected and is displayed in red. The kick drum appears in the global mix and is displayed in green, You can see where the layers conflict:



After selecting the bass guitar layer and casting peaks, you can see that the areas that conflicted with the kick drum have been removed:



Molding a layer

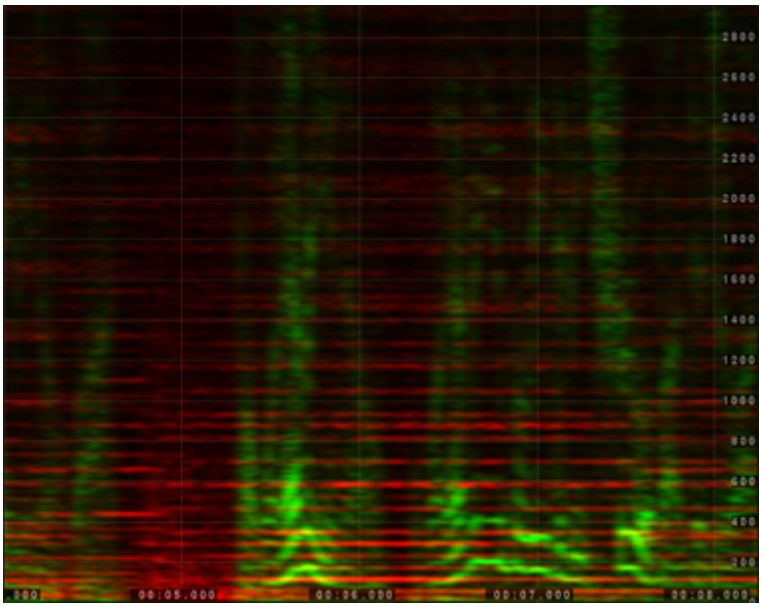
In spectral molding, the frequency content of the global mix serves as a mold that shapes the selected layer, removing spectral data that exists outside the area of the mold in the same way a cookie cutter allows you to cut shapes from dough.

1. Load the layers you want to process. For more information, see "Importing a layer" on page 25.

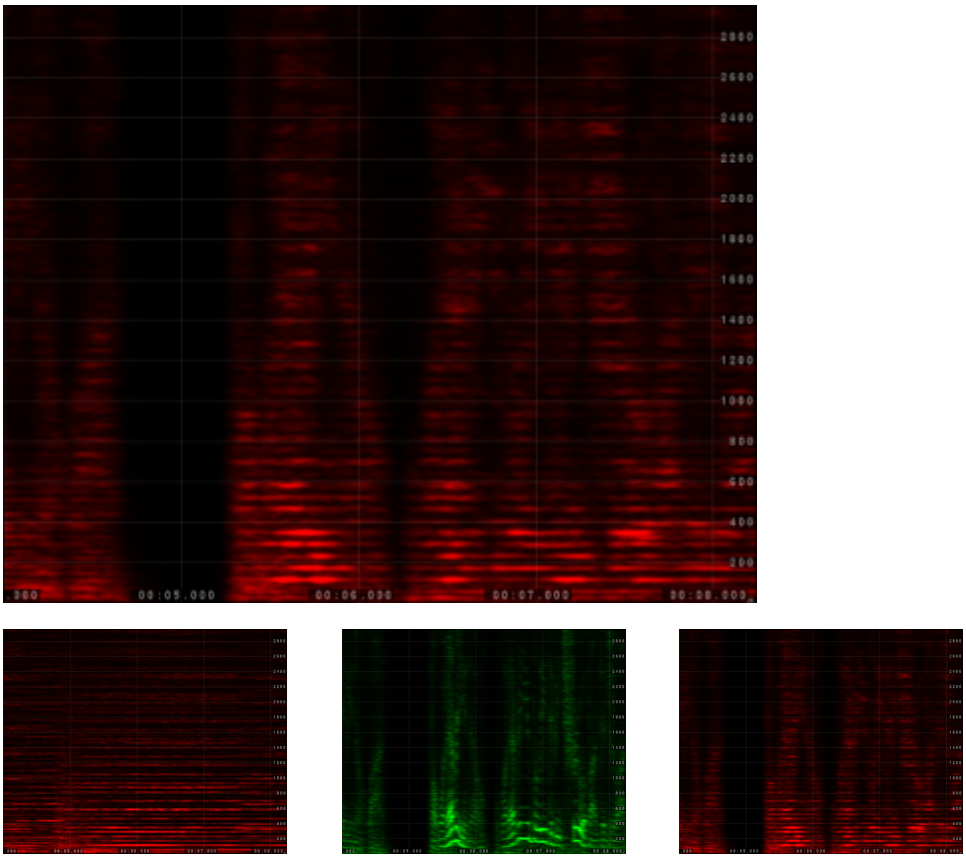
   Casting operates on the global mix. If your current project contains layers you want to exclude from the casting process, deactivate those layers in the Layers panel. For more information, see "The Layers panel" on page 22.

2. Adjust the spectrum display until the harmonics are clearly visible. For more information, see "The Spectral Settings toolbar" on page 13 and "The Spectral Display toolbar" on page 14.
3. In the Layers panel, select the layer you want to apply the mold to.
4. Choose **Process** > **Mix** > **Cast Peaks**. The Cast Peaks dialog is displayed.
5. Select the **Mold selected layer** radio button.
6. Type a value in the **ratio** box (or use the spin control) to set the gain that will be applied to your molded peaks.
7. Type a value in the **time margin** and **freq margin** boxes (or use the spin controls) to control the time and frequency range that is used when molding peaks. Increasing the margin settings produces softer (feathered) peaks.
8. Click **Preview** to preview the current dialog settings and adjust the settings as needed.
9. Click **Apply** to mold peaks with the current dialog settings.

To demonstrate the effect of molding, let's start with a simple two-layer project with a music bed and a voiceover. The following image shows the global mix of the voiceover and a music bed. The music bed layer is selected (it is displayed in red). The voiceover layer is part of the global mix (it is displayed in green), You can see where the layers intersect:



After selecting the music bed layer and molding peaks, the voiceover layer from the global mix is used to mold the frequency content of the music bed. In the following image, you can see that mold of the voiceover layer has cut away portions of the music bed layer that do not intersect with the voiceover:



Applying VST effects

1. Create a new SpectraLayers project or open an existing project file.

   For more information, see "Creating a new project" on page 25 or "Opening a project" on page 25.

2. Select the layer where you want to apply an effect.
3. Choose **Process** > **VST Effects (64 bit)** or **VST Effects (32 bit compatibility)**. The VST Effects dialog is displayed.
4. **Use the VST Effects dialog to choose a plug-in and preset.**
5. Adjust the effect parameters as desired.

   Click the **Preview** button to preview the selected layer with the current effect settings.

6. Click the **Apply** button to apply the effect.

Chapter 9

Working with metadata

SpectraLayers Pro can read and edit metadata, markers, and regions.

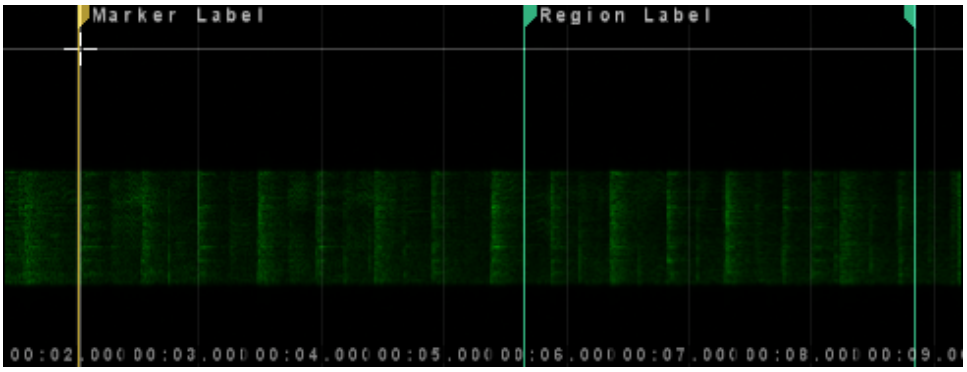
Editing metadata

Choose **Edit** > **Metadata** to display the Metadata dialog, where you can view and edit metadata saved in the current sound file.

1. Choose **Edit** > **Metadata**. The Metadata dialog is displayed.
2. Double-click a metadata value and type a new value in the box.
3. Press Tab to commit your change and select the next metadata value.

Editing markers and regions

If you're editing a sound file that contains markers and regions, they will be shown in the spectral display.



Choose **Edit** > **Markers** to display the Metadata dialog, where you can change marker and region positions, edit labels, delete markers, and add new markers and regions.

Choose **Options** > **Spectrum** > **Show Markers and Regions** to show or hide markers and regions in the spectrum display.

Editing a marker or region

If you want to adjust markers and regions individually, you can drag the marker and region tags in the spectrum display. For more detailed editing, choose **Edit** > **Markers and Regions** to display the Markers and Regions dialog.

1. Choose **Edit** > **Markers and Regions**. The Markers and Regions dialog is displayed.
2. Edit the **Position** value to change a marker or region's start time.

3. Edit the **Length** value to change a region's length.
4. Edit the text in the **Description** column to edit a marker or region's label.

   To rename a marker or region quickly, right-click (Windows) or control-click (Mac) the marker or region tag in the spectrum display, and then choose **Rename** from the shortcut menu.

5. Close the Markers and Regions dialog to update the spectral display with your changes.

Adding a marker or region

If you want to add a marker quickly, right-click the top of the spectrum display and choose **Add marker** from the shortcut menu.

If you want to add a region quickly, create a time selection, right-click (Windows) or control-click (Mac) the top of the spectrum display and choose **Add region** from the shortcut menu.

If you want to add multiple markers and regions with precise control over their position, choose **Edit > Markers and Regions** to display the Markers and Regions dialog.

1. Choose **Edit** > **Markers and Regions**. The Markers and Regions dialog is displayed.
2. Click the **Add Marker** button. A row is added to the marker list in the Markers and Regions dialog.
3. Type a value in the **Position** value to set a marker or region's start time.
4. Type a value in the **Length** value to set a region's length.
5. Type a value in the **Description** column to set a marker or region's label.
6. Close the Markers and Regions dialog to update the spectral display with your changes.

Deleting a marker or region

If you want to delete a marker or region quickly, right-click (Windows) or control-click (Mac) the marker tag at the top of the spectrum display and choose **Delete marker** from the shortcut menu.

If you want to delete multiple markers and regions, choose **Edit** > **Markers and Regions** to display the Markers and Regions dialog.

1. Choose **Edit** > **Markers and Regions**. The Markers and Regions dialog is displayed.
2. Select a marker or region in the Markers and Regions dialog.
3. Click the **Delete Marker** button.
4. Close the Markers and Regions dialog to update the spectral display with your changes.

Chapter 10

Tips

This section contains tips and shortcuts to help you work efficiently with SpectraLayers.

Shortcuts

Shortcuts are provided to help you edit quickly and easily in SpectraLayers:

Windows Shortcuts

Mac OS Shortcuts

Windows shortcuts

Spectral display shortcuts

Command	Shortcut
Pan spectral display	Shift+Arrow Keys Press P and drag the spectral display. Press Shjft+T and drag to pan horizontally. Press Shift+F and drag to pan vertically. Middle-click and drag.
Zoom spectral display horizontally	Mouse Wheel to zoom horizontally. Ctrl+Mouse Wheel to zoom horizontally and vertically. Press Ctrl+T and drag to zoom horizontally.
Zoom spectral display vertically	Shift+Mouse Wheel. Ctrl+Mouse Wheel to zoom horizontally and vertically. Ctrl+Arrow Up/Down Press Ctrl+F and drag to zoom vertically. Middle-click + Mouse Wheel to zoom vertically.
3D Displacement tool	D Alt+middle-click+drag.
Adjust Level multiplier	Alt+Mouse Wheel

Command	Shortcut
Adjust Gamma	Alt+Shift+Mouse Wheel Alt+middle-click+Mouse Wheel
Window Size (Fourier transform size)	Page Up/Page Down
Horizontal/vertical channel orientation	O
Show/hide grid	Ctrl+Shift+G
Show or hide markers and regions	Ctrl+Shift+K
Toggle bilinear filtering	Ctrl+Shift+B
Lock axes	Shift+Click
Draw line	Shift+Click
Lock bottom of spectrum display to 0 Hz	Ctrl+Shift+L

Edit shortcuts

Command	Shortcut
Snap to Grid	Ctrl+G
Move	M Alt+Shift+T Alt+Shift+F
Scale	X Ctrl+Alt+T Ctrl+Alt+F
Select	S
Select Time	T
Select Frequency	F
Set mouse cursor	Double-click the **Snap to Grid** button .
Set time cursor	Double-click the **Time Cursor** button .
Set selection area	Double-click the **Select** button .
Clear selection	Esc

Transport shortcuts

Command	Shortcut
Time Cursor	C

Command	Shortcut
Stop	Home Stop Esc
Play	Space
Play All	Shift+Space
Play Repeat	Ctrl+Space
Play Clipboard	Tab
Loop Playback	Ctrl+L
Record	Ctrl+R

Tools shortcuts

Command	Shortcut
Tool	0-9 Alt+0-9

Layers shortcuts

Command	Shortcut
Select Layer	Up/Down Arrow
Center Display on Layer	Double-click layer.
Move Selected Layer	Ctrl+Page Up/Down
Solo Selected Layer	Shift+S
Duplicate Layer	Ctrl+D
New Layer	Ctrl+Shift+N
Deselect Layer	Esc
Delete Layer	Delete
Switch between selected layer and mix	Shift+Tab

View shortcuts

Command	Shortcut
Fullscreen	F11/Esc

Mac OS shortcuts

Spectral display shortcuts

Command	Shortcut
Pan spectral display	Shift+Arrow Keys Press P and drag the spectral display. Press Shjft+T and drag to pan horizontally. Press Shift+F and drag to pan vertically. Middle-click and drag.
Zoom spectral display horizontally	Scroll up/down to zoom horizontally. Cmd+scroll up/down to zoom horizontally and vertically. Press Shift+T and drag to zoom horizontally.
Zoom spectral display vertically	Shift+scroll up/down Cmd+scroll up/down to zoom horizontally and vertically. Cmd+Arrow Up/Down Press Shift+F and drag to zoom vertically. Middle-click + Mouse Wheel to zoom vertically.
3D Displacement tool	D Option+middle-click+drag.
Adjust Level multiplier	Option+scroll up/down
Adjust Gamma	Option+Shift+scroll up/down Option+middle-click+Mouse Wheel
Window Size (Fourier transform size)	Page Up/Page Down
Horizontal/vertical channel orientation	O
Show/hide grid	Cmd+Shift+G
Show or hide markers and regions	Cmd+Shift+K
Toggle bilinear filtering	Cmd+Shift+B
Lock axes	Shift+Click
Draw line	Shift+Click
Lock bottom of spectrum display to 0 Hz	Cmd+Shift+L

Edit shortcuts

Command	Shortcut
Snap to Grid	Cmd+G
Move	M Option+Shift+T Option+Shift+F
Scale	X Cmd+Option+T Cmd+Option+F
Select	S
Select Time	T
Select Frequency	F
Set mouse cursor	Double-click the **Snap to Grid** button .
Set time cursor	Double-click the **Time Cursor** button .
Set selection area	Double-click the **Select** button .
Clear selection	Esc

Transport shortcuts

Command	Shortcut
Time Cursor	C
Stop	Home Stop Esc
Play	Space
Play All	Shift+Space
Play Repeat	Cmd+Space
Play Clipboard	Tab
Loop Playback	Cmd+L
Record	Cmd+R

Tools shortcuts

Command	Shortcut
Tool	0-9
	Option+0-9

Layers shortcuts

Command	Shortcut
Select Layer	Up/Down Arrow
Center Display on Layer	Double-click layer.
Move Selected Layer	Cmd+Page Up/Down
Solo Selected Layer	Shift+S
Duplicate Layer	Cmd+D
New Layer	Cmd+Shift+N
Deselect Layer	Esc
Delete Layer	Delete
Switch between selected layer and mix	Shift+Tab

View shortcuts

Command	Shortcut
Fullscreen	Shift+Cmd+F/Esc

Integration with DAWs and samplers

This section contains information to help you use SpectraLayers with other DAW and sampler applications. For more information about using these applications, please refer to the manufacturer's documentation.

When you set up SpectraLayers as an editor, you can work in another DAW or sampler, move to SpectraLayers for fine edits, and then send the edited file back to your DAW or sampler.

For information about using SpectraLayers Pro with Sound Forge Pro 11, please see "Editing with Sound Forge Pro" on page 27.

Sony ACID Pro

1. In ACID Pro, choose **Options** > **Preferences**.
2. In the Preferences dialog, click the Editing tab.
3. Click the **Browse** button next to an **Editing application** box and browse to C:\Program Files (x86)\Sony\SpectraLayers *<version number>*\Win32\SpectraLayers.exe.
4. Click **OK** to close the Preferences dialog.
5. Right-click an event on the ACID timeline and choose **Event Clip** > **Edit in SpectraLayers.exe**. SpectraLayers will start.
6. Edit as needed in SpectraLayers.
7. When you're done editing, close SpectraLayers Pro. You'll be prompted to export your changes back to ACID Pro. Click **Yes**, and the edited file replaces the event's clip on the ACID timeline.

Sony Vegas Pro

1. In Vegas Pro, choose **Options** > **Preferences**.
2. In the Preferences dialog, click the Audio tab.
3. Click the **Browse** button next to the **Preferred audio editor** box and browse to C:\Program Files (x86)\Sony\SpectraLayers *<version number>*\Win32\SpectraLayers.exe.
4. Click **OK** to close the Preferences dialog.
5. Right-click an event on the Vegas timeline and choose **Open in Audio Editor** (or **Open Copy in Audio Editor)**. SpectraLayers will start.
6. Edit as needed in SpectraLayers.
7. When you're done editing, close SpectraLayers Pro. You'll be prompted to export your changes back to Vegas Pro. Click **Yes**, and the edited file is set as the active take on the Vegas timeline.

Ableton Live

1. In Ableton Live, choose **Options** > **Preferences**, and then go to **File Folder** > **Sample Editor**.
2. Enable SpectraLayers as a sample editor:
   - On Windows, browse to C:\Program Files (x86)\Sony\SpectraLayers *<version number>*\Win32\SpectraLayers.exe.
   - On Mac OS, browse to /Applications/SpectraLayers *<version number>*.app.
3. Enable **View** > **Detail** > **Clip**.
4. Right-click the sample and choose **Manage Sample File** > **Edit**.

You may want to consolidate your sample before editing.

Cakewalk SONAR

1. Start SpectraLayers (as admin) and choose **Options** > **Link** > **Cakewalk SONAR**.
2. Click **Apply**.
3. **Exit SpectraLayers.**
4. In Cakewalk SONAR, click a sample and choose **Tools** > **SpectraLayers**.

E-MU Emulator X3

1. In Emulator X3, choose **Preferences** > **Other Settings** > **Paths** > **External audio editor**.
2. Browse to C:\Program Files (x86)\Sony\SpectraLayers *<version number>*\Win32\SpectraLayers.exe.
3. Choose **Sample Edit** > **External Audio Editor**.

Final Cut Pro

1. In Final Cut Pro, choose **System Settings** > **External Editors** > **Audio Files**.
2. **Browse to /Applications/SpectraLayers *<version number>*.app.**
3. Right-click a sample and choose **Open in Editor**.

FL Studio

1. In FL Studio, choose **Tools** > **External tools** > **File location**.
2. Browse to C:\Program Files (x86)\Sony\SpectraLayers *<version number>*\Win32\SpectraLayers.exe.
3. Select **Launch with sample**.
4. Right-click a sample and choose **Tools** > **SpectralLayers**.

KONTAKT

1. In Kontakt, choose **Options** > **Handling** > **External wave editor**.
2. Browse to C:\Program Files (x86)\Sony\SpectraLayers *<version number>*\Win32\SpectraLayers.exe.
3. Click **Ext. Editor** in the Wave Editor toolbar

Logic Pro

1. In Logic Pro, choose **Preferences** > **Audio** > **Sample Editor** > **External Sample Editor**.
2. Browse to C:\Program Files (x86)\Sony\SpectraLayers *<version number>*\Win32\SpectraLayers.exe.
3. Select a sample and choose **Options** > **Audio** > **Open in SpectraLayers** (or press Shift+W shortcut).

Media Composer

1. Start SpectraLayers (as admin) and choose **Link** > **Pro Tools** > **Media Composer**.
2. Click **Apply** and close SpectraLayers.
3. In Media Composer, select a sample and choose **Tools** > **Audiosuite** > **SpectraLayers** > **Render**.

   Media Composer will freeze during editing.

Pro Tools

1. Start SpectraLayers (as admin) and choose **Link** > **Pro Tools** > **Media Composer**.
2. Click **Apply** and close SpectraLayers.
3. In Pro Tools, select a sample and choose **Audiosuite** > **Other** > **SpectraLayers** > **Process**.

   Pro Tools will freeze during editing.

REAKTOR

1. In REAKTOR, choose **Preferences** > **Directories** > **External Sample Editor**.
2. **Browse to C:\Program Files (x86)\Sony\SpectraLayers *<version number>*\Win32\SpectraLayers.exe.**
3. In the Sample Map Editor, click **Edit Sample List/Edit**.

REAPER

1. In REAPER, choose **Options** > **Preferences** > **External Editors** > **Add**.
2. Enable SpectraLayers as a wave editor:
    - On Windows, browse to C:\Program Files (x86)\Sony\SpectraLayers *<version number>*\Win32\SpectraLayers.exe.
    - On Mac OS, browse to /Applications/SpectraLayers *<version number>*.app.
3. Right-click a sample and choose **Open Items in editor** (or press Ctrl+Alt+E).

Samplitude/Sequoia

1. In Samplitude/Sequoia, choose **Options** > **Program Preferences** > **Destructive effect calculation**.
2. Select **Generate a new FX file for each effect** and **Save Effect File in highest resolution (32 Bit Float)**.
3. Start SpectraLayers and choose **Options** > **Link** > **Samplitude/Sequoia**.
4. Select the folder of your Samplitude/Sequoia project and the folder where the project's audio files are located.
5. Leave SpectraLayers open
6. In Samplitude/Sequoia, right-click a sample and choose **Edit copy of Wave Project** and click **Yes** when asked to edit in SpectraLayers.
7. When edited and exported back from SpectraLayers to Samplitude/Sequoia, select **View** > **Rebuild Graphic Data**.

Steinberg HALion

1. In HALion, choose **Options** > **Edit** > **External Wave Editor**.
2. Enable SpectraLayers as a wave editor:
    - On Windows, browse to C:\Program Files (x86)\Sony\SpectraLayers *<version number>*\Win32\SpectraLayers.exe.
    - On Mac OS, browse to /Applications/SpectraLayers *<version number>*.app.
3. Right-click the sample editor and choose **Sample** > **Load into External Editor**.

Tracktion

1. In Tracktion, select a sample and choose **Edit audio file** > **Set the audio editor to use**.
2. Enable SpectraLayers as a sample editor:
    - On Windows, browse to C:\Program Files (x86)\Sony\SpectraLayers *<version number>*\Win32\SpectraLayers.exe.
    - On Mac OS, browse to /Applications/SpectraLayers *<version number>*.app.
3. Select a sample and choose **Edit audio file** > **Edit using SpectralLayers**.

Editing in a wave editor

Combining SpectraLayers with a powerful wave editor such as Sound Forge allows you to seamlessly blend the best elements of spectral editing and waveform editing into your workflow.

1. Select the layer you want to edit, and create a selection if you want to open only a time- or freqency-limited portion of the layer in your editor.

    For more information, see "Selecting spectral data" on page 35.
2. **Choose Process > IO > External Wave Editor.**
3. The first time you use the **External Wave Editor** command, you need to choose where your editor application is installed.
    - On Windows, browse to C:\Program Files (x86)\Sony\Sound Forge Pro *<version number>*\Forge*<version number>*.exe.
    - On Mac OS, browse to /Applications/Sound Forge.app.
4. Click the **Edit** button.
5. Edit as needed in your wave editor, and then save the file and close the wave editor.
6. **After you close your wave editor, the edited layer is updated in SpectraLayers.**

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